Senegalese Grandmothers promote improved maternal and child nutrition practices: "The guardians of tradition are not averse to change "

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Abstract:

The vast majority of community nutrition/health programs in developing countries focus on women of reproductive age and few explicitly involve senior women, or grandmothers. In Senegal, as in many other places, older, experienced women play an influential role in household maternal and child health matters. Formative research in Serer villages revealed their importance and this was taken into account in an action research nutrition education project in which grandmothers were encouraged to promote improved nutritional practices related to pregnancy (e.g. decreased work and improved diet) and infant feeding (e.g. breastfeeding and complementary feeding). A participatory communication/ empowerment education approach was used involving songs, stories and group discussion. Quantitative and qualitative data were collected to both document and evaluate the intervention. Triangulation of the evaluation data suggests that twelve months after the intervention was initiated there were significant improvements in grandmothers' nutritional knowledge, in their advice to women of reproductive age and in the nutrition-related practices of these younger women associated both with pregnancy and infant feeding. For example, in the pre-test only 20% of grandmothers stated that they advise pregnant women to decrease their workload whereas in the post-test 87% reported giving this advice. At the same time, 91% of WRA in villages with the grandmother strategy reported having decreased their workload during their last pregnancy whereas in villages with nutrition education activities for women of reproductive age (WRA) but not with grandmothers, only 34% of younger women reported having done so. These findings provide evidence of grandmothers' ability to learn, to integrate new information into their practices and to positively influence the practices of WRA. These results support the need for future maternal and child health programs, in different cultural contexts, to involve grandmothers and in so doing to build on their intrinsic commitment to family well-being.

Key words: grandmothers, MCH, health/nutrition education

Introduction:

In the past ten years, research has significantly advanced our understanding of the nutritional needs of infants and young children, and to a lesser extent of female adolescents and women of reproductive age (LINKAGES, 1999), however, there has been much less progress in identifying interventions that lead to sustained improvements in nutrition practices (Samba et al., 1999). In spite of considerable investment in nutrition education (NE) programs in developing countries over the past twenty years, relatively few interventions have documented sustained changes in community practices related to women and children's nutrition (Allen & Gillespie, 2001; Andrien & Beghin, 1993). The limited impact of such programs may be attributed, in part, to inadequacies in the reductionist conceptual framework used to understand health/nutrition practices in household and community settings and in the limitations of the predominant, directive pedagogical approach used in nutrition education.

In community health programs in developing countries, the approach adopted in most nutrition/health education/communication (NHEC) interventions reflects two key dimensions. First, most programs use directive, unidirectional, message-based methods with community members (Lee & Garvin, 2003). Second, the goal of most NE programs is to bring about changes in individual nutrition-related behaviors of women of reproductive age (WRA) (Andrien & Beghin, ibid.). The basic assumption made in these programs is that if WRA acquire information on optimal maternal and child nutrition practices, they will adopt those practices (Leslie, 1989). Very few programs have involved older, experienced women, or "grandmothers," as we refer to them here. (Note [1])

This paper has several purposes. First, we identify several conceptual and methodological limitations in the predominant approach used in community nutrition education in developing countries, and particularly regarding the failure to involve grandmothers in nutrition promotion strategies. Second, we summarize the results of a community study conducted in Serer villages in western Senegal which revealed the protaganistic role played by grandmothers in maternal and child health (MCH). Third, and primarily, we describe the methodology and results of a community NE project which aimed to strengthen the role of grandmothers in promoting improved maternal and child nutrition practices related to exclusive breastfeeding, improved diet and decreased workloads during pregnancy. The NE project was carried out between 2001 and 2002 in the context of a broader community health program supported by an international non-governmental organization, Christian Children's Fund (CCF), which has been implemented since l988 in collaboration with the Ministry of Health (MOH).

Background

The vast majority of NE programs in developing countries are grounded in the *transmission-persuasion* model of education/communication (Waisbord, 2001).

This predominant model, or paradigm, has been widely supported by North American and international development agencies and has been manifest in various approaches, used over the past l5 years and referred to as *health communication* (HC) (Graeff et al. 1993), *information, education and education* (IEC) (WHO, 1997), *social marketing* (Manoff 1985) and most recently *behavior change communication* (BCC) (Stetson & Davis, 1999). While the terminology has changed, these approaches are conceptually similar.

Although there have been very few rigorous evaluations of community nutrition education/ communication interventions (Allen & Gillespie, ibid.), most developing country MCH program staff agree that directive methods involving delivery of messages to WRA can contribute to improvements in women's *knowledge* of prescribed MCH practices. However, there is also a consensus that they are much less effective in bringing about changes in their practices. Criticism by developing country health sector staff of the dominant transmission-persuasion paradigrandmother is infrequently formally articulated. Critiques of the dominant communication paradigrandmother come primarily from academics in the north (Waisbord, ibid; Servaes et al.,1996; White et al., ibid; Figueroa et al., 2002; Lee & Garvin, ibid.) and more recently from development practitioners (Stetson & Davis, ibid.).

Our critique of the dominant communication paradigm draws primarily on literature dealing with health-related behavior change, and communication and learning processes within households and communities from various fields namely, medical anthropology (Dressler & Oths 1997), development communication (White et al., 1994), adult education (Mezirow,1991), health promotion (McLeroy et al., l988; Green et al., 1996); and transcultural nursing (Leininger, 1995) . These literatures elucidate the limitations of the two parameters which characterize most NHEC programs and suggests alternative concepts and methods for MCH programs. (Note [2])

First, in the predominant transmission-persuasion paradigm, succinct messages are intended to persuade people to adopt expert-proposed health/nutrition behaviors. The approach is essentially top-down and one-way, involving *audiences, target groups* and *message delivery* (Thomas, l994). A recent review of developing country nutrition interventions (Allen & Gillespie, ibid.) concludes that programs using this top-down approach have "seldom been effective in the long term" in promoting changes in nutrition practices (p. 75).

An alternative approach to communication/education is supported by program results and research on participatory communication (Riaño, 1994) and adult learning (Mezirow, ibid.,) which involve the use of use of participatory, dialogical methods based on *constructivst* learning through which community members are challenged to integrate "traditional" and biomedical concepts of health/illness.

The second salient feature of the predominant approach to NHEC is the focus on individual behavior change of WRA. The reductionist and behaviorist foci on individuals, isolated from their socio-cultural and environmental contexts disregards insights from anthropology (Dressler & Oths, ibid.) regarding the influence of social structure and collective socio-cultural values on individual beliefs and behavior. Particularly in so-called "traditional" societies, collective, group values have a preeminent impact on individual thinking and behavior (Kayongo-Male & Onyango, 1984). In most cases, MCH health education programs do not seriously take this into account and assume that younger women can autonomously decide what behaviors to adopt, insulated from the socio-culturally-defined values and practices which are dictated in the household and community contexts of which they are a part (Berman et al., 1994, Mosley 1984).

An alternative orientation in NHEC programs is to promote changes in community norms which can lead to changes in individual behavior. This option is supported by the conclusions of a major review of health education interventions (Clark and McLeroy, 1995) "To have enduring effects, interventions must have an impact on social norms" (p. 277).

Role of senior women in MCH programs

The reductionist focus of MCH programs on WRA has tended to camouflage other household level actors who influence health and illness decision-making and practices (Santow, 1995). While in the mainstream international public health literature discussion of the role of older women, or grandmothers, has been largely ignored, their multi-faceted role in family health has been documented, often by anthropologists, in Africa (Kayongo-Male & Onyango, ibid.), Asia (Jernigan & Jernigan, 1992; Gryboski, 1996; Wiley, 2002), Latin America (Finerman, 1989, McKee, 1987) and the Pacific (Kataounga, 1998) as well as amongst North American Hopi Indians (Kitzinger, l996). Other anthropologists have also discussed the prominent role of senior female household members in family health in non-western societies (Kleinman, l980; Spector, l979; Helman, l984).

While there is evidence from geographically-diverse societies regarding the influence of grandmothers on MCH practices, amongst the hundreds of studies on different MCH topics in developing countries the role of grandmothers is very rarely mentioned. For example, in a recent review of forty-one breastfeeding promotion programs in developing countries (Green's (l998) grandmothers were not explicitly involved in any of the interventions.

Two sets of factors are identified which help explain the discrepancy between the central role which grandmothers play in MCH in many societies and their absence from MCH policies and programs. First, MCH policies and programs have generally given limited attention to the family, or household, (Bruce & Lloyd, 1992; Kleinman, ibid; Berman et al., ibid.) of which grandmothers are a part.

Secondly, there are a series of widely held negative biases regarding the role of older women, which tend to discredit their experience and involvement in MCH.

The reductionist focus in MCH programs on women and children simplifies the parameters which program planners must deal with, but at the same time it gives only a superficial picture of MCH-related dynamics at the household level. Most MCH programs are not based on a comprehensive understanding of the household context and the intrahousehold processes related to health promotion and illness management (Buvinic et al., l987; Mosley, ibid.) in which grandmothers are often intimately involved. (Note [3])

A second factor that mitigates against the involvement of grandmothers in MCH programs is a series of widely-held negative biases toward these senior women. Discussions in many countries both with MOH staff and with international donors (conducted by the first author) have revealed three negative stereotypes regarding grandmothers' role in MCH. First, there is denial that older women do in fact influence MCH practices of younger women and families. Second, there is a widely-held belief that the influence exerted by older women on MCH is generally negative. Older woman are invariably associated with the use of traditional remedies that are invariably assumed to be harmful. Third, is the common belief that older women are not capable either of learning new things or changing their ways. The combination of these several stereotypes projects a negative impression both of grandmothers' experience and their potential to promote "modern" MCH practices

Maternal and child nutrition in Senegal

In Senegal the nutritional status of both WRA and children is generally precarious, especially in rural areas. In the project area in rural Senegal, a quarter of all WRA (29%) suffer from chronic malnutrition (BMI<18.6) (CCF, 1997) and it is estimated that during pregnancy approximately 60% are anaemic (Wade, 1994). The unsatisfactory nutritional status of WRA is further compromised during pregnancy by the widespread belief amongst all ethnic groups that a pregnant woman should work hard and not eat too much so that the foetus will be small and delivery easier (MOH/WELLSTART, 1996). The consequences of inadequate nutritional intake and high energy expenditure during pregnancy are associated with the fact that in the CCF project area 15% of infants are born with low-birth-weight (<2.500 kilos)(CCF, 2001).

Breastfeeding (BF) is widespread in Senegal and rural women breastfeed for an average of 22 months (MOH/Senegal, 1999). However, in most cases BF practices are not optimal. Only a quarter (24%) of all infants begin breastfeeding in the first hour after birth and most receive water and other fluids and foods during the first weeks and months of life (MOH/Senegal, ibid.). Only 8% of infants are exclusively breastfed (EBF) (i.e. given breast milk only and no water) for four to five months (MOH/Senegal, 1999).

As regards the influence of older women on MCH, in many earlier studies on different MCH topics, the role and influence of grandmothers have **not** been highlighted. In a qualitative community study carried out in l995 (MOH/ WELLSTART, ibid.) with the five major ethnic groups, including Serer, it was found that in both rural and urban areas, mothers-in-law and other female relatives generally have considerable influence on breastfeeding practices. "Compared to health workers, these (older) women are closer, more respected and have more influence on younger women" (p. 5).

Nutrition Education in Senegal

A 1995 analysis of nutrition and health education in Senegal showed that most NE methods used in the country are based on the dominant HNEC message-driven paradigrandmother using didactic teaching techniques and almost all programs aim to bring about changes in the practices, or behavior of WRA (Aubel, l995a). The MOH Director of Health Education, at that time, identified several factors which have limited the impact of past health/NE efforts: first, the use of directive methods; second, failure to involve influential household and community members; and third, failure to include discussion of existing socio-cultural values and beliefs in discussions of recommended practices. Prior to the CCF intervention discussed here, there have been no previous programs in the country that have aimed to influence grandmothers' knowledge and advice related to MCH issues.

Intervention setting:

The NE strategy with grandmothers, referred to hereafter as the "grandmother strategy," was implemented in two health districts, Thiadaye and Joal, in western Senegal where CCF is implementing a community child health program in collaboration with district health staff. The pilot grandmother strategy was carried out in 13 of the 33 rural villages supported by the child health program. CCF has a cadre of well-trained community animators who had primary responsible for implementing the grandmother activities.

The predominant ethnic group in the program area is Serer (80%), and the grandmother strategy was implemented exclusively in Serer villages. Among the major ethnic groups in Senegal, the Serer are particularly known for conserving their traditional beliefs and practices related to health, spirituality and well-being and community leaders and elders play a dominant role in ensuring that traditional values and practices are maintained (Oriana, 2001).

METHODS

Action Research Methodology

The grandmother pilot project was implemented as an action research (AR) project in the context of a larger community health program. (Note [4]) The aim of the AR was to test an innovative NE strategy. The project consisted of four

activities: 1) an initial qualitative community study on the role of grandmothers in health and nutrition; 2) development of the NE strategy with CCF and MOH stakeholders; 3) implementation of the participatory NE strategy in l3 villages; and 4) documentation and evaluation of the strategy. Each of these activities is described below. In keeping with the principles of AR, the CCF/MOH team was involved in all activities, including documentation and evaluation. The first author, specialized in applied community health research, provided ongoing methodological advice and participated to some extent in all activities.

Qualitative community study

As a basis for developing the grandmother strategy, formative research was conducted to analyze grandmothers' roles related broadly to MCH at the household and community levels, and specifically to investigate their advice and practices related to maternal and child nutrition issues addressed in the CCF program. In order to understand community perspectives on this little-researched topic, qualitative methods were used. The conceptual underpinnings of the study were based on a systems framework incorporating precepts from the *health-seeking model* (Chrisman, 1977), Kleinman's (1980) notion of the *tri-sectoral health system* (biomedical, traditional and family sectors) and the *household production of health* (Berman et al., ibid.).

The authors of this article prepared the study methodology and coordinated data collection and analysis by CCF and MOH field staff. For two reason, program staff were intimately involved in conducting the study in anticipation of their involvement in subsequent activities with the grandmothers: first, to optimize their understanding of grandmothers' MCH-related roles, attitudes and practices; and second to develop their ability to demonstrate interest in and respect for grandmothers' knowledge and experience.

Data was collected exclusively through focus group interviews conducted in a purposive sample of ten out of the thirty-three villages where the broader CCF child health project is being implemented. (Note [5]) Within each village interviewees were also identified through purposive sampling and each focus group was composed of between two and twelve persons. Focus group interviews were conducted with four categories of interviewees as follows: 76 WRA (10 focus groups); 60 men with children <5 years of age (8 focus groups); 10 male community leaders (5 focus groups); and 114 grandmothers (10 focus groups). Interviewing was carried out by two teams of interviewers. The qualitative interview data was analyzed manually on an ongoing basis during the three-week data collection phase. Data analysis involved the use of a simplified approach to *content analysis*, the triangulation of information collected from the four categories of interviewees and concept mapping of the relationships and interaction between grandmothers and other household members around MCH-related activities.

Study findings:

Major findings and conclusions of the study are summarized here, drawn from the full research report (Aubel et al., ibid.). Based on analysis of the focus group data, key themes regarding grandmother's roles and their MCH-related knowledge and practices are presented here and some are illustrated with quotations from the interview data.

Grandmothers' role in the household and community:

There was a high degree of consensus between the different categories of interviewees that due to grandmothers' age and experience in family life, they play an important role in family decision-making in all domains, including MCH. Multiple functions of grandmothers were identified at the household level: management of household affairs; assistance with domestic/household chores; education/socialization of WRA and children; advising younger generations; mediation and conflict-resolution; supervision/ care of children, animals and household items; management of all family health problems. Several functions of grandmothers outside the family were also identified: advising and supporting other grandmothers regarding illness incidents; and providing health-related advice to women in families without a grandmother. There was agreement between community leaders, men and younger women that the role played by grandmothers is of critical importance to the proper functioning of families and the community. A frequently heard saying states, "A home without a grandmother is like a house without a roof." Family members generally expect grandmothers to play a multi-faceted role based on their experience and wisdom and grandmothers have a sense of moral obligation to assume that role. Interviewees described grandmothers as generous, patient, tolerant and committed to the well-being of family members, especially of young children.

Grandmothers' role in MCH:

There was a consensus between all four categories of interviewees that for all health promotion and illness management grandmothers are consulted, generally not only by younger women, but also by husbands and other family members due to their demonstrated expertise. All categories of family members state that during childhood illnesses the grandmothers play a lead role in determining the diagnosis, prescribing initial home treatment and advising on the need to take the sick child for consultation either with traditional healers and/or MOH health workers. This proverb reflects grandmothers' sentiment that younger mothers are obliged to seek their expertise: "A blind person cannot lead a hunting party that is going after snakes."

The study data showed that during illness episodes the grandmothers coordinate the health-seeking process at the household level, delegating certain tasks to others, such as asking the husband to purchase drugs, advising on treatment procedures, such as preparation of medicinal teas, and directly administering

other procedures, such as massage or feeding. Several key conclusions regarding grandmothers' influence and involvement in MCH are: WRA do not make autonomous decisions regarding MCH practices; grandmothers play a leading role in defining and enforcing community MCH norms; husbands delegate responsibility for MCH matters to their mothers/grandmothers; husbands expect their wives to follow grandmothers' instructions; and grandmother networks have collective responsibility for promoting the well-being of women and children in the community.

Grandmothers's advice on maternal and child nutrition:

The research results showed that grandmothers provide on-going advice regarding nutritional practices of women and children during pregnancy and after delivery. Younger women say that in many cases they follow grandmothers' advice without knowing why it is recommended. Men generally seek advice from their own mothers, "The grandmothers advise us what our women and children should and should not eat. They know best."

According to younger women, grandmothers give various types of advice to them during pregnancy. Most advise wearing a talisman and drinking herbal teas, to protect both the woman and the foetus from spiritual and other forces. Most advise not consuming certain foods which can harm either the woman or the foetus and generally, eating as usual or a bit less to avoid having a large foetus and a difficult delivery. Also, most grandmothers advise pregnant women to work as usual, in order to make the body strong for delivery, and to decrease only the heaviest tasks, for example, to carry only 4 buckets of water per day rather than six.

Regarding BF, the results of the interviews showed that all grandmothers greatly value BF and give precise advice regarding BF initiation and duration. According to most WRA and grandmothers themselves, the majority of grandmothers suggest waiting to initiate BF until the second or third day either, "to wait for the milk to arrive," "to wait for the child's mouth and throat to open" or "to wait for all of the colostrum to come out." However, a minority of grandmothers do advise putting the newborn to the breast immediately after birth. Most grandmothers' state that most young mothers do not BF frequently enough and attribute this behavior either to the fact that "they don't have enough milk" or that "they have too much work to do and not enough time." Few of the grandmothers interviewed had ever heard of EBF (BF without giving additional water). All grandmother interviewees stated that it would be impossible for a child to survive on breastmilk alone and that all children need to also drink water either "to avoid drying out their throat and mouth" or because "Senegal is a hot country and water is necessary to quench the child's thirst."

Grandmothers' knowledge of technical MCH priorities:

Interviews with the grandmothers revealed that they have limited contact with health workers and the "new ideas" about MCH. The interview teams were particularly surprised to hear the majority of the grandmothers state that they regret that they are never invited to attend the health education sessions and that they are interested in knowing about the "new ideas" on MCH. In all grandmother focus groups the idea was expressed that, "The world is changing and our knowledge is not up to date."

Study recommendations: At the end of the study, a workshop was held with district and CCF staff to discuss study findings and formulate recommendations for future MCH programs. Two recommendations were made by workshop participants: 1) grandmothers' role in MCH should be acknowledged by all health workers; and 2) grandmothers should be viewed as resource persons and partners rather than as obstacles and competitors. Both the study findings and these recommendations served as the basis for developing the grandmother pilot NE strategy.

Nutrition education strategy:
Based on the results of the community study and the interest of district health staff in developing collaborative MCH efforts with grandmothers, a community NE strategy was planned. The methodology for the NE strategy was similar to that used in Laos in 1998-99 in a WHO & UNICEF grandmother-focused project which was developed by the first author with the Institute of MCH in Vientiane (Aubel & Sihalathavong, 2001). In Senegal the specific goal of the strategy was: to strengthen the role of grandmothers at the household and community levels in promoting optimal nutrition practices, while at the same time promoting changes in community nutrition norms related to nutritional practices of pregnant women and breastfeeding children. Pilot project objectives were to promote: decreased workload and improved diet of pregnant women; early initiation of breast-feeding; exclusive breast-feeding for six months; and the introduction of nutritious, local complementary foods to infants from six months of age.

***Conceptual framework**:*

The several constructs that served as the foundation for development of the NE intervention were: an assets-based approach to developing existing human resources in the community (Kretzmann & MacKnight, 1993); the enhancement of social networks as a health promotion strategy (Israel & Rounds, 1987); transformative learning (Mezirow, ibid.) wherein "learners" actively and critically analyze both their own experience and alternative solutions in order to construct their own strategies to deal with everyday problems. (Note[6]); community organizing for health (Minkler, 1998); empowerment education (Freire, 1970; Wallerstein & Sanchez-Merki, 1994) to increase community commitment and capacity to collectively solve problems; and participatory communication (Servaes et al., ibid.) which includes the role of the "catalyst communicator" (White, 1999). (Note [7])

Nutrition education (NE) methods: The NE methods used in the grandmother strategy are primarily based on adult education problem-posing, critical thinking techniques (Freire, ibid; Brookfield, 1991). The educational activities used were songs, stories and discussion, all simple and socio-culturally appreciated activities. In a six-day workshop, the stories and songs were developed by program stakeholders related to each of the four priority nutrition topics. Two types of songs were developed, first, 'songs of praise' to the grandmothers, to show respect for them and their important role in family and community health and to encourage them to participate in group activities. Second, 'teaching songs' contained key information on the priority nutrition topics. Unlike traditional, didactic health education activities, the problem-posing "stories-without-an-ending" elicited discussion of problematic nutrition-related situations and possible solutions (Aubel, 1995b). To ensure critical discussion and analysis of the story content and of possible solutions, for each story a set of open-ended questions was developed based on Kolb's (1984) experiential learning cycle.

Community intervention:
The grandmother strategy was carried out in l3 villages over a nine-month period and in each community four NE sessions were organized, each session focusing on one of the priority nutrition topics and facilitated by CCF/MOH staff. All grandmothers/senior women in the community were invited to attend the sessions in addition to community leaders and CHVs so that they would be informed of the issues discussed, and could encourage the grandmothers after the sessions. A second important component of the strategy involved follow-up and reinforcement of the nutrition topics discussed in each community session by the community leaders, CHVs, grandmother leaders, who emerged during the village sessions, and CCF field workers.

Documentation and evaluation of the strategy
A combination of quantitative and qualitative data were collected in order to both document and evaluate the intervention. Data collection included: 1) before-after individual structured interviews with grandmothers (referred to as "pre-post interviews") in intervention villages to assess potential changes in their nutritional knowledge and advice after nine months of NE activities; 2) individual structured interviews with WRA in intervention villages (with the grandmother strategy) and control villages (without the grandmother strategy) to assess the potential effects of the grandmother intervention on the practices of the WRA; 3) qualitative process documentation (Korten, 1989) (Endnote [8]) during the nine month intervention and for three months afterwards; and 4) focus group evaluation interviews with all categories of community actors after twelve months.

Before and after interviews with grandmothers*:* Structured individual interviews were conducted with grandmothers in intervention villages before the intervention was initiated and after twelve months to assess changes in their nutrition-related knowledge and advice. A questionnaire composed of 8

questions dealt with their advice to WRA on pregnancy (diet, workload and iron-rich foods), breastfeeding (colostrum, timing of initiation of breastfeeding and exclusive breastfeeding) and complementary feeding (timing and type of complementary foods).
Questions were formulated in a "colloquial" way to facilitate understanding by the grandmothers. Here are a few examples of the questions asked:
1) Regarding nutritional advice to pregnant women interviewees: "There was one pregnant woman whose mother-in-law advised her to eat more than usual during her pregnancy. There was another pregnant women whose mother-in-law advised her to eat less than usual during pregnancy. Which one of the mother-in-laws gave the best advice?"
2) Regarding exclusive breastfeeding: "There are two women who both have babies three months old. One gives her baby only breastmilk. The other gives breastmilk and after each feed also gives the baby some water. Which one of the women has the best approach?"
3) Regarding the introduction of complementary foods: "At how many months of age do you think that a child should start getting something in addition to breastmilk?"

The pre and post questionnaire was administered by CCF and MOH staff to a purposive sample of grandmothers. While instructed to interview 15 grandmothers in each of the 10 intervention villages (the same villages in which the formative community study had been conducted), however, in the pre-test only 134 grandmothers were interviewed because in some villages the total number of grandmothers was less than fifteen. In the pre-test 150 grandmothers were interviewed in 13 villages, as three villages were added to the intervention area after the pre-test was conducted. The data was manually tabulated and results are presented in Table I. For all responses P values were calculated.

Individual interviews with WRA in intervention and control villages: Twelve months after the intervention was initiated, a structured questionnaire was administered to a purposive sample of WRA from a random sample of both intervention villages (with the grandmother strategy) and control villages (without the grandmother strategy). The WRA interviewed all had a child under 12 months of age (i.e. they had been either pregnant and/or breastfeeding while the grandmother intervention was being implemented) and the questions asked them to report on what they had done during their last pregnancy and with their infant. The questions included in the questionnaire addressed most, but not all, of the same parameters as those included in the grandmother pre-post interviews related to pregnancy, breastfeeding and complementary feeding. CCF team members did not aim to collect information on exactly the same parameters from grandmothers and WRAs. It was, in fact, an afterthought to juxtapose the two sets of data, as presented in Table I.

For example, questions asked of WRA regarding the same parameters for which examples were given (above) from the grandmother pre and post interview questions are as follows:
1) Regarding nutritional advice to pregnant women interviewees: “When you were pregnant last time did you eat more than usual or less than usual?”
2) Regarding exclusive breastfeeding: “With your baby (i.e. the one < 12 months old) when did you start giving him water to drink?”
3) Regarding the introduction of complementary foods: “With your baby when did you start giving him his first porridge?”

Interviews were conducted by CCF and MOH staff with 200 women,100 in intervention villages and 100 in control villages. It is important to point out that in both intervention and control villages the WRA **were** involved in NE activities organized for WRA in which the same nutritional practices focused on in the grandmother sessions were addressed. This data was manually tabulated.

Process documentation (PD): The purpose of the PD was to understand the interface between the NE intervention and community actors, including grandmothers, community leaders, CHVs, WRA, men and children. Copious notes were taken during the NE sessions and during follow-up visits based on observations and conversations with community members related to the grandmother NE strategy. This data was manually analyzed by the three authors and several of the CCF field workers, using content analysis and concept mapping.

Focus group evaluation interviews*:* After one year, extensive focus group interviews were conducted in all 13 intervention villages with grandmothers, men, community leaders, CHV, health post nurses, health workers and school teachers. These interviews addressed: feedback from family members and community leaders on the NE strategy; changes in grandmothers’ advice to family members; changes in the advice/practices of husbands, grandmothers and WRA related to women’s and children’s nutrition; changes in community leaders’ knowledge of the four priority nutrition topics; impact of grandmothers’ involvement in the NE activities at the household level. These data were manually analyzed by CCF staff and the first author using content analysis and concept mapping.

RESULTS

The results of the grandmother intervention are based on triangulation of the four sets of quantitative and qualitative data, described above. The quantitative results provide a succinct impression of the outcomes of the intervention on grandmothers and WRA. The qualitative results provide a more systemic understanding of the impact that the intervention had not only on grandmothers and WRA, but also on grandmother networks, community leaders (CL),

households and communities at large. In addition, the qualitative data provides insights into the links between the intervention, its effects and its outcomes.

Quantitative results

Table I displays the results of the two sets of quantitative data collected from grandmothers and WRA. Comparison of the pre and post-test interview data from grandmothers (left columns in Table I) in intervention communities reveals significant changes on all eight parameters related to their nutrition-related knowledge and advice. Regarding their advice to pregnant women: the percentage of grandmothers advising decreased workload increased more than four-fold (from 20% to 87%; those advising pregnant women to eat "more than usual" increased considerably (from 60% to 95%); and grandmothers who identified two locally available iron-rich foods almost doubled (57% to 95%). Regarding breastfeeding: grandmothers who advise putting the child to the breast during the first hour after birth more than doubled (46% to 98%); grandmothers who believe that colostrum should be given to the newborn increased greatly (57% to 97%), which is consistent with responses regarding initiation of BF; and those who advise EBF for five months more than tripled (26% to 94%). Grandmothers' knowledge of the appropriate time to initiate complementary feeding increased significantly (29% to 92%) as did their knowledge of the recommended composition of enriched porridges to be used as a first complementary food (59% to 97%).

Results of structured interviews with 100 WRA in intervention villages and 100 in control villages also show significant differences on all parameters related to women's reported practices during their most recent pregnancy and care of their infant (left columns in Table I). Related to pregnancy: in intervention villages most WRA (91%) reported decreasing their workload during pregnancy whereas in control sites only a third (34%) of the women reported having done so; in intervention villages most women (90%) report having eaten more during pregnancy while in control villages only a third (35%) of the women report having done so; and regarding grandmothers' efforts to improve the pregnant women's diet, in intervention villages the majority (88%) stated that grandmothers provided them with "special foods" whereas in control villages only a third (33%) of women said that grandmothers had provided such extra support. Regarding breastfeeding: in intervention villages almost all (98%) of WRA reported initiating breastfeeding in the first hour after delivery whereas only about half (57%) of women in control villages said that they followed this recommended practice; and in intervention villages the vast majority (96%) reported EBF their last child for five months whereas only about a third (35%) of women in control village reported doing so. Lastly, almost all WRA in intervention villages (97%) report having introduced initial complementary foods at five/six months as recommended, as compared with only about a third in control villages (35%).

Comparison of the trends observed in the quantitative data collected both from grandmothers and from WRA (Table I) allows us to compare changes over time

in the knowledge and advice of grandmothers in intervention villages with the reported practices of WRA in control and intervention villages. From this comparative analysis two significant observations emerge: first, both sets of data reveal positive changes/trends related to the priority nutrition-related practices promoted in the NE strategy and second, there is considerable similarity between grandmother post-test advice and WRA's reported practices which strongly suggests that grandmothers' advice determines WRAs' practices. For example, in the post-test 87% of grandmothers report advising decreased workload during pregnancy while at the same time 91% of women who were recently pregnant in the same (intervention) villages, report having decreased their workload, which is in sharp contrast to only 34% of women in villages without the grandmother strategy. Related to breastfeeding, most grandmothers in the post-test (93%) report advising EBF while similarly most WRA (93%) in intervention villages report having EBF their last infant which suggests a dramatic increase when compared with grandmother pre-test advice/responses (29%) and the level of EBF in non-intervention villages (35%).

This parallel analysis of the two sets of data provides strong evidence to suggest that as a result of the intervention there were dramatic improvements in grandmothers' knowledge and advice and that changes in their advice have resulted in changes in WRA's practices. These trends are further supported by the findings from the extensive qualitative data, discussed below.

Qualitative results:
The objectives of the continuous process documentation and of the end-of-intervention evaluation focus group interviews were similar and dealt primarily with nutrition-related knowledge and practices of community actors and with NHEC methods used in the intervention. In both information was collected on: the involvement and reaction of grandmothers, CLs and CHVs to the NE sessions; their opinions regarding the NHEC methods (stories, songs and discussion); the reaction of all categories of community members, including WRA, men, school teachers and children to the grandmother strategy; evidence of changes in grandmothers' advice to younger women, and in changes in WRA's practices. The qualitative data provide insights into these issues, in addition, however, several unanticipated parameters emerged from this semi-structured data collection which shed light on other effects of the intervention, which are not nutrition-related, and which suggest possible linkages between the intervention and the nutrition-related outcomes. A detailed account of the qualitative results is found in the full report of the NE project (Aubel et al., 2001). Here, given the limitations of space, we present the results that relate to the effect of the NE strategy on each of the community groups directly or indirectly involved in the intervention, namely: the grandmothers; community leaders; community health volunteers; households; and the wider community. For each group one or more quotations from the qualitative data are cited which typify the themes articulated by the different categories of community actors.

Effects on grandmothers: a heightened sense of self-esteem; increased knowledge of key maternal/child nutrition topics; openness to new ideas about maternal/child nutrition and interest in integrating them with traditional practices; and an increased sense of empowerment in their role as health/nutrition advisors.

> Grandmothers are human beings like everyone else. We can learn and change our ways.
>
> Now we feel much stronger because not only do we have our traditional knowledge but, in addition, we have acquired the knowledge of the doctors.
>
> We shouldn't be stuck in our old ways. We should be open to the new ideas and see how to integrate some of them into our practice.

Effects on community leaders (CL): increased knowledge of key maternal/child nutrition topics; and increased encouragement of grandmothers' in their MCH role.

> Grandmothers are a social treasure for the community. We should reinforce their role and status in the community.
>
> We make a point of attending all of the grandmother sessions. The sessions are very beneficial, because they allow grandmothers to share ideas between themselves regarding the traditional and new approaches to breast-feeding, women's nutrition etc. This is instructive for us as well. Through these activities their status in the community has increased. We are actively encouraging them to participate, to learn and to try out the new practices.

Effects on community health volunteers*: (**CHV**):* increased appreciation of the role played by grandmothers in MCH; and increased commitment to collaborate with them.

> Before we talked to the young women in the village. They listened to us but often they didn't put our advice into practice, often because the grandmothers were opposed to the new ideas, like exclusive breastfeeding, or eating certain vitamin rich foods during pregnancy.

Effects on households: improved H/N advice from grandmothers; increased appreciation of grandmothers' role in family MCH; improved H/N practices of WRA; increased support from grandmothers to pregnant and breastfeeding WRA regarding their diet and workload; increased support from husbands to WRA for health/nutrition needs; improved relationships between mother-in-laws and

daughter-in-laws; and strengthened commitment of grandmothers to grand-children's well-being.

> Now the advice the grandmothers give us includes both traditional and modern ideas. Now when you are pregnant they tell you to eat more and to work less. Before there were certain foods they told us not to eat and they forbid us from snacking between meals. Now they tell us to eat more and especially green leafy vegetables, beans and small dried fish so we'll be strong when we deliver. Before each woman did her own work. Now, when a woman is pregnant they ask other women in the family to help out, or they do some of your work themselves. Now they understand us better and that's why we feel closer to them. (Woman with a two-month old infant)

Effects on the wider community: increased involvement of grandmothers in community MCH activities (vaccination days; cooking demonstrations etc.); strengthened grandmother networks; increased support from grandmothers to neighboring households; increased empowerment of grandmother leaders to promote N/H ideas; and encouragement by CLs of husbands to follow the new H/N advice.

Although the NE intervention focused on grandmothers, there is convincing evidence that it lead to a series of effects at various levels (described above), including changes in grandmothers' knowledge and advice and in WRA's practices. It is quite difficult to assess changes in *community nutrition norms*, however, the CCF/MOH field workers believe, and triangulation of the documentation/evaluation data suggests that community norms related to nutrition during pregnancy and infancy may be changing as a combined function of grandmothers' enhanced role in the health/ nutrition domain and their commitment to propagating their newly-acquired knowledge.

Discussion:

The combined quantitative and qualitative results of the grandmother-focused community NE strategy provide strong evidence that the intervention had a positive and significant effect on grandmothers' knowledge and attitudes toward the recommended maternal and child nutrition practices, that grandmothers subsequently modified their advice to pregnant and breastfeeding women, and that the younger women changed their practices accordingly. It is noteworthy that while grandmother activities did not take place in the control villages, NE activities with groups of WRA were conducted. In spite of this, however, in the control villages limited or no change was observed in the younger women's nutrition practices. These outcomes suggest that without concomitant changes in grandmothers' advice to support alternative practices, the WRA were unable to put the new ideas into practice. In other words, grandmothers' opinions and advice have a determining influence on the practices of WRA. These findings

corroborate the conclusions of the initial qualitative community study regarding the influential role played by grandmothers in MCH matters at the household level.

As explained in the methodology section, all of the documentation and evaluation data were collected in collaboration with CCF/MOH staff involved in the NE intervention and this is a possible source of interviewer bias. At the same time, the triangulation of the data from several sources increases the reliability of the results.

The considerable changes observed in women's nutritional practices within a relatively short timeframe (12 months) are surprising given the conventional wisdom regarding the extended time required for nutrition-related behavior change to occur. For example, the reported decreases in pregnant women's workloads and improvements in their diet are quite astonishing considering the obstacles to acceptance of these "modern" concepts due first, to conflicting socio-cultural values and practices, and second, to the severe economic constraints faced by most Serer households in the project area. Similarly, the reported increase in EBF to over 90% is impressive given reports from health workers regarding the resistance they encounter promoting this practice. Although the MOH has been actively promoting EBF for almost ten years, in 1999 on a national level only 8% of women reported adopting this practice (MOH/Senegal, ibid.). A statement by one of the community leaders suggests the link between the documented acceptance of new practices by the younger women and the unconventional grandmother-focused intervention.

> Grandmothers are very respected and everyone seeks their advice, men as well as women. To succeed in promoting changes in health habits it is essential that you work with grandmothers who are the guardians of tradition.

The qualitative documentation/evaluation data provide insights into the multi-dimensional effect that the NE intervention had not only on grandmothers but also on other community members. This data suggest the linkages between the intervention and the outcomes related to apparent changes in the practices of WRA and evolving community norms. This data furnish extensive evidence that the NE strategy had a systemic and catalyzing effect on the community-at-large. The grandmothers, in partnership with other influential community actors, became catalysts for discussion of target nutrition issues and solutions.

Evidence of incipient changes in community nutrition norms is supported by the convergence of grandmothers' acquisition of "modern" knowledge on women's and children's nutrition, increased community confidence in their advisory role, and their relentless commitment to promoting family and community well-being.

Conclusions:

In developing countries, relatively few nutrition education (NE) strategies have lead to sustained changes in community nutrition practices (Allen & Gillispie, ibid). Most programs focus on WRA and aim to change their knowledge and practices. The intervention reported on here focused primarily on grandmothers and the objective was to strengthen their knowledge of key maternal and child health nutrition issues and through them to modify community norms. Results of the action research NE intervention suggest that it contributed to significant changes in priority nutrition practices of WRA, including decreased workload and improved diet during pregnancy, and increased exclusive breastfeeding (EBF), and that community norms related to these and other key nutritional practices may be changing.

Four key facets of the NE intervention are identified which we believe contributed to the positive effects of the intervention and ultimately to the outcomes.

First, we are convinced that the positive results are linked to the fact that not only were the grandmothers involved, but that they were considered and treated as a valuable community resource, rather than as an obstacle, as has too often been the case in past MCH programs. Consistent with an assets-based approach to community capacity-building (Kretzmann & MacKnight, 1993) the project aimed to mobilize this previously untapped resource and in so doing gave grandmothers access to new information and increased community recognition for their role in health promotion. The assumptions were made that the grandmothers would be open to the educational process involving "sharing old ideas and new ideas" and that they would be able to learn and change. The skeptics who initially questioned these assumptions and the potential of the grandmothers saw that these "guardians of tradition" were not averse to incorporating new ideas into their repertoire of practices.

On a theoretical level, the grandmothers' enthusiasm and openness to the "new ideas" on maternal and child nutrition is consonant with: a) Erickson's ideas on the universal drive for *generativity*, defined as the need to both "expand and nurture the self" and to "nurture the next generation" (McAdams & de St.Auben, l998), b) by the research on the salubrious benefits of social network membership (Israel & Rounds, ibid.); and c) by self-efficacy theory which suggests the fundamental human need for positive self-esteem and empowerment (Bandura, 1977).

Second, we believe that the receptivity of the grandmothers and the wider community to the intervention was also due to the transcultural, or syncretistic, approach (Aubel, 1994) which markedly contrasts with NHEC reductionist approaches which deal exclusively with the transmission of "modern," or biomedical, concepts. Inspired by precepts from transcultural nursing (Leininger, ibid.), key characteristics of the syncretistic approach were: acknowledgement of health-related values, practices and roles in the communities' popular health culture; juxtaposition of traditional and biomedical concepts in nutrition education

activities/materials; and challenging communities to integrate the "old" and the "new."

Third, the centerpiece of the NE intervention was the empowerment education methodology, inspired by Paolo Freire's work (ibid.) on the *problem-posing approach* to education. This approach, and specifically the use of stories-without-an-ending, depicting typical, nutritionally-problematic situations challenged grandmothers to develop their own solutions. Kent (1988) succinctly defines the aim of *empowerment* in NE, "to increase your capacity to define, analyze and act on your own problems" (p. 193). Dialogue with grandmother groups was followed by discussion within the community at large. This lead to development of socio-culturally acceptable solutions while at the same time it fostered commitment on the part of community members to implement them.

Fourth, and also of critical importance to the success of the intervention was the role played by field worker-facilitators who piloted the activities with the grandmothers through respect, listening and semi-structured dialogue. These attitudes and skills demonstrated by the "Grandmother Team," differ significantly from the conventional top-down, expert-driven approach often adopted by health/development workers. (Note [8]) The crucial *relationship dimension* of community health education/communication efforts is often neglected in training efforts with community health/development workers but we believe that this aspect is critical to development of future strategies involving grandmothers. For field workers steeped in "message delivery" approaches it is not easy for them to establish genuine, horizontal communication relationships and to adopt a posture of co-learners (Freire, ibid.) rather than expert, message disseminators.

In conclusion, in the formulation of MCH strategies our technical objectives and pragmatism invariably influence program development. The interface between technical priorities and local cultural realities tend to be given little attention. In this regard, the thoughts of the CCF program coordinator (and third author) on the grandmother-focused NE strategy in the Senegalese cultural context are quite thought-provoking, "Over the years, MCH programs in Senegal have focused on WRA and this has created an artificial rift between the socio-culturally defined roles of grandmothers and younger women." In all honesty, we believe that the responsiveness of the community to the intervention stemmed as much, if not more, from their satisfaction with the fact that it acknowledged and enhanced the role of the grandmothers as from the potential nutritional benefits for women and children.

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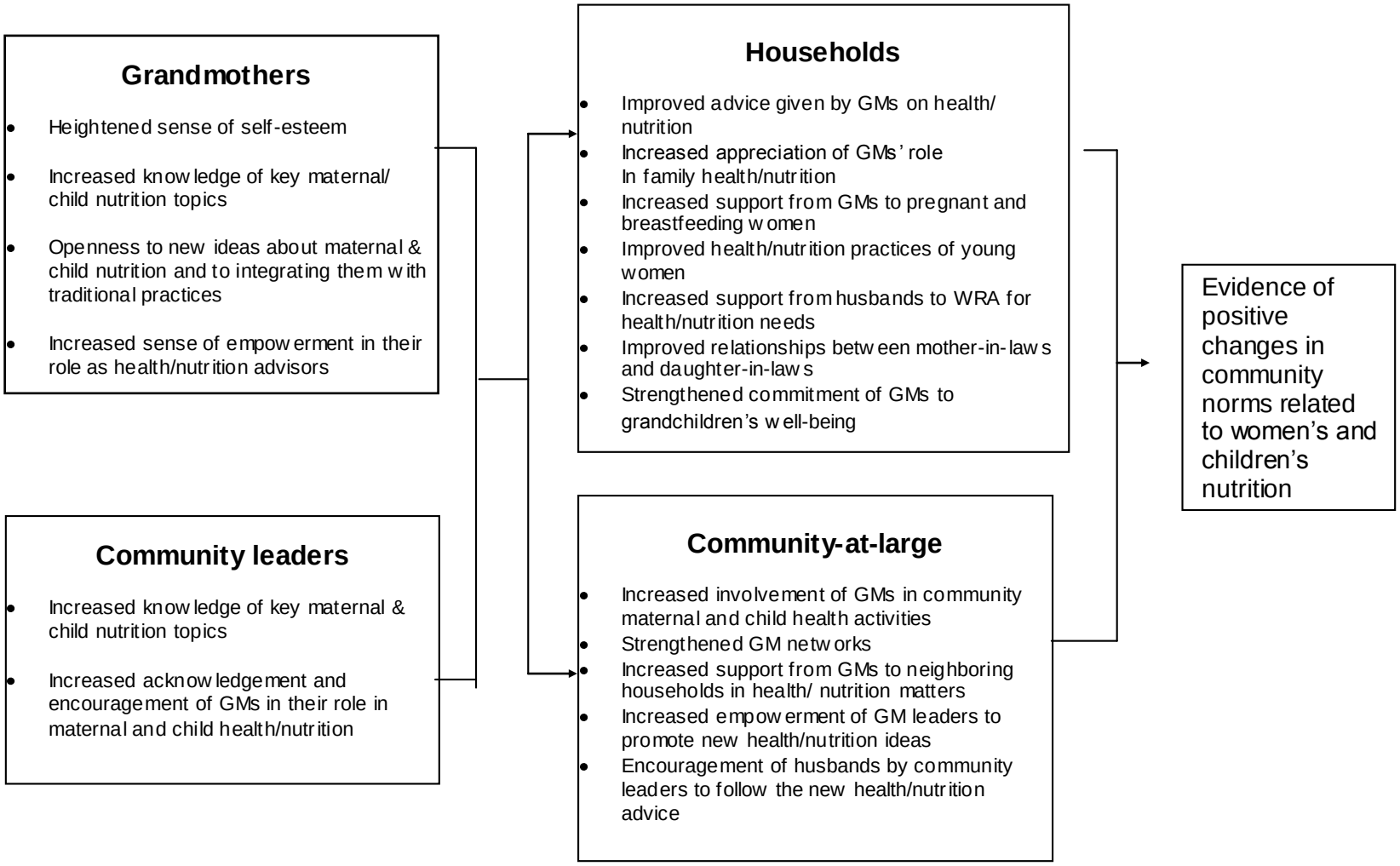
Table I: Comparison of two data sets: nutrition-related advice from Grandmothers and practices of women of reproductive age (WRA)

Grandmothers' advice: Pre-test (N = 134)	Grandmothers' advice: Post-test (N = 150)	Women's practices: Villages with GRANDMOTHER strategy (N = 100)	Women's practices: Villages without GRANDMOTHER strategy (N = 100)
Pregnant women should decrease their workload			
20%	87%	91%	34%
Pregnant women should increase their food intake			
60 %	95%	90%	35%
Grandmothers provide special foods for pregnant women			
		88%	33%
Newborns should be put to the breast in the first hour after birth			
46%	98%	98%	57%
Newborn should be given colostrum			
57%	97%		
Exclusive breastfeeding for five months			
29%	93%	93%	35%
Introduction of first complementary foods (porridge) at five/six months			
29%	92%	93%	35%
Enriched porridge (*bouillie*) given as first complementary food			
59%	97%		
Grandmothers' knowledge of foods rich in iron (ability to name 2 foods)			
57%	95%		

Note : All differences are statistically significant (*P<0.0001)*

Diagram I: Effects of participatory nutrition education strategy on community actors and community nutrition norms



Notes:

[1] The term 'grandmother' is used to refer not only to biological or paternal grandmothers, but also to other older, experienced women who serve as advisors to younger women on various household issues. In the Serer, matrilineal context discussed here, the grandmothers are primarily mother-in-laws. When women marry they move into the residence of their husband's parents. Maternal grandmothers are sometimes present in the community as well.

[2] For an extensive critique of the dominant transmission-persuasion paradigm see: Aubel and Sihalathavong (2001.)

[3] Two concepts from public health literature, which emphasize the importance of the family in MCH are: the household production of health (Schuman & Mosely, l994; Berman et al., 1994); and the ecological approach to health promotion (Green et al., 1996). Both of these frameworks embody a systems approach to household health and suggest the interdependent relationship between women and the household social, cultural and economic environment. Generally, however, these more systemic orientations have not influenced either the assessment of MCH needs nor the design of MCH programs.

[4] Salient characteristics of an action research approach include: the initial analysis and interventions are based on a *systems approach*; there is extensive

use of inductive, qualitative research methods; a collaborative process is used which involves program/organizational actors; and the research contributes to organizational learning (Cunningham, 1993).

[5] The formative research was carried out in the ten villages in which the grandmother strategy was to be implemented. Shortly after the research was completed it was decided to increase the number of villages in the action research project from ten to thirteen.

[6] The currently predominant models in adult education deal with transformative and constructivist learning (Mezirow, ibid.; Brookfield,1986). In these models the learning process is viewed as the *construction of knowledge* rather than the internalization of pre-defined knowledge, or messages as in the behaviorist, information-processing models of learning.

[7] For an in-depth discussion of conceptual and methodological groundings of the grandmother nutrition education strategy see Aubel & Silhalathavong (2001).

[8] The approach used by the facilitators of the NE activities with grandmother groups embodies the two key facets of the facilitator role in empowerment education described by Wallerstein and Sanchez-Merki (1994): first, facilitator commitment to communities and to development of trusting, ongoing

relationships; and second, facilitators elicit a dialogical process based on listening and respect.